

ABSTRACT OF THE DISCLOSURE

A system for quantifying surface characteristics detects and quantifies characteristics of a surface of an object. For example, the system may quantify changes in surface roughness without contacting the specimen and without requiring precise temporal or spatial stability. The system may also quantify the evolution or progression of a particular characteristic of a surface, such as a defect, a slipband, a crack, a microcrack, a pit, a damage feature, corrosion, a contour change, an impact crater, a change in residual stress, and so on. The system may include an energy source, a detector section, and a process section. The energy source transmits a source signal to the surface of the object. The source signal is specularly reflected and/or scattered by the surface to yield one or more received signals. The detector section receives the received signal and, in turn, provides a detector signal indicative of the received signal. The processor applies an algorithm to the detector signal to quantify an evolution in one or more characteristics of the surface.